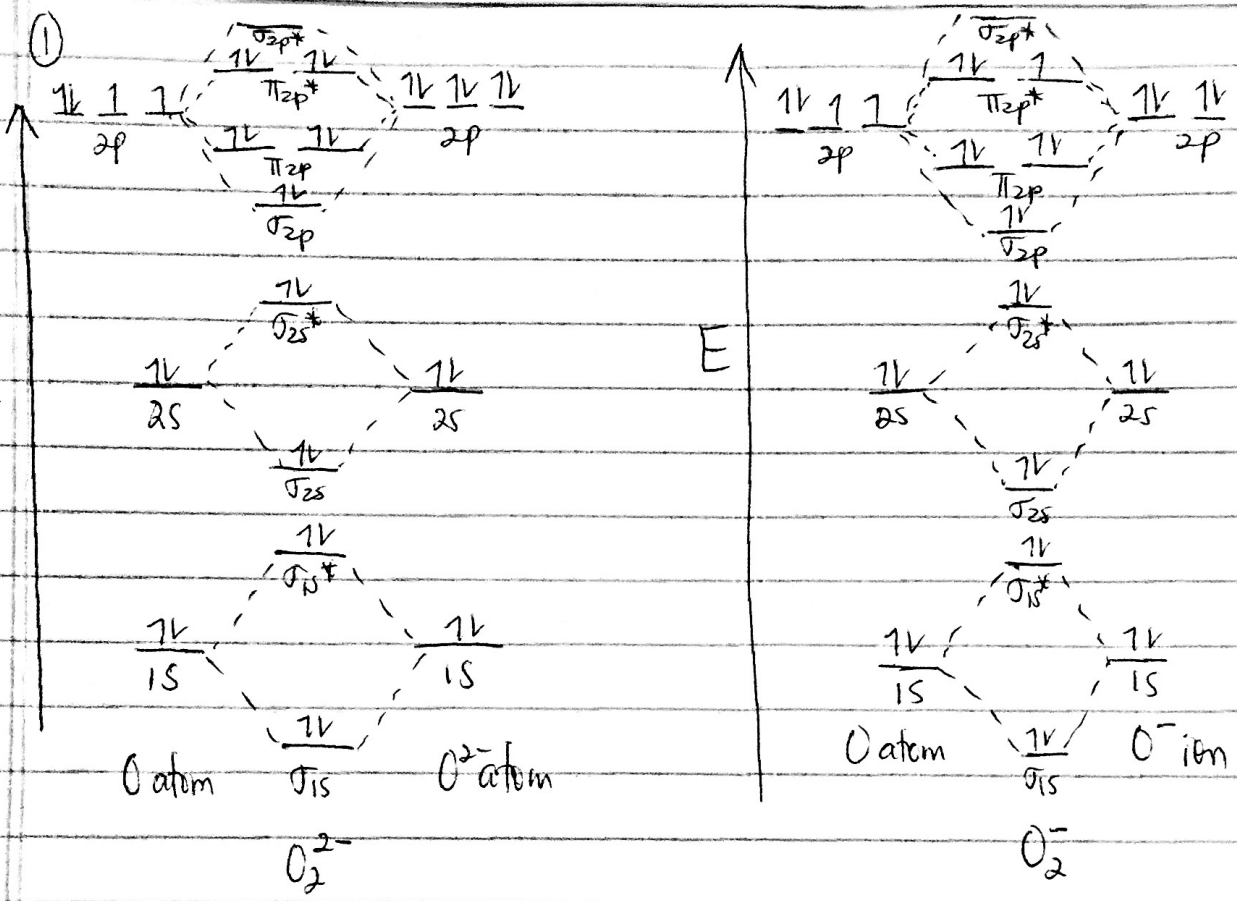
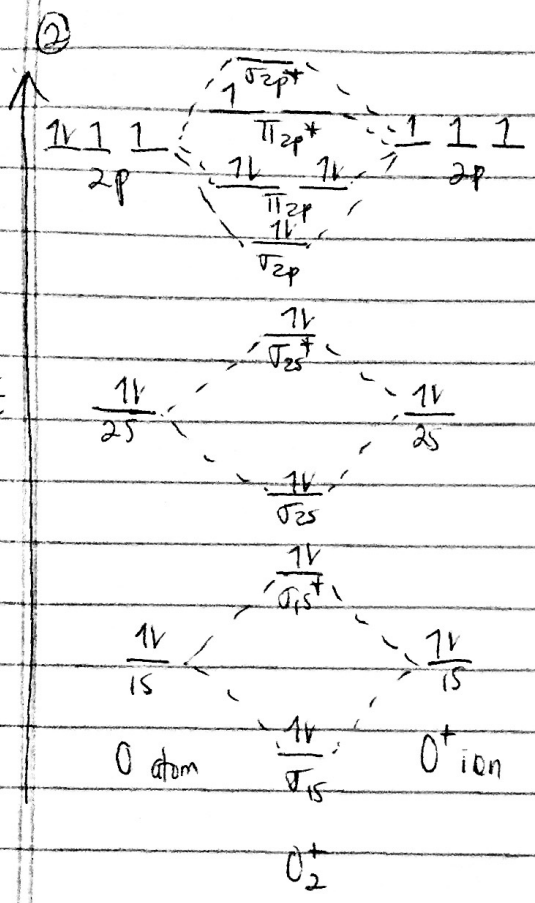
CHM129
Problem Set #6



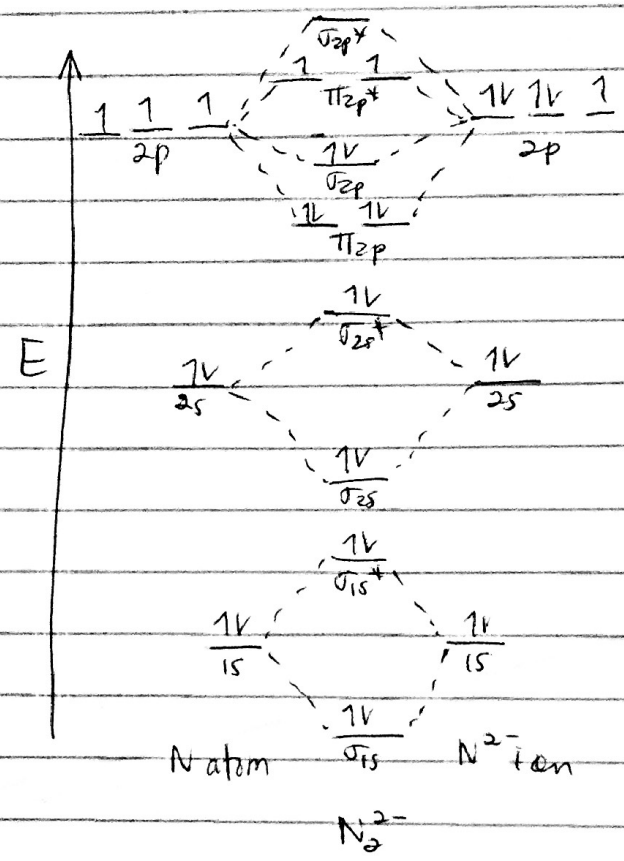
O_2^{2-} : B.O. $= \frac{1}{2}(10-8) = 1$

O_2^{-} : B.O. $= \frac{1}{2}(10-7) = \frac{3}{2}$ or 1.5

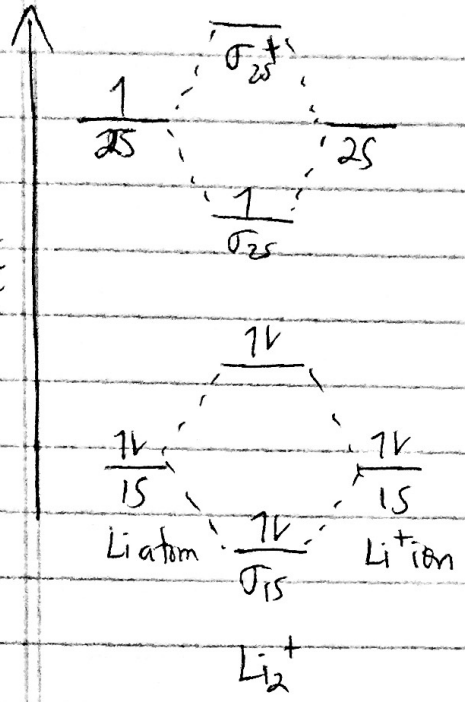
O_2^{2-} has a bond order of 1, while O_2^{-} has a bond order of 1.5. For the same bonded atoms, the greater the bond order the shorter the bond, so O_2^{-} has the shorter bond.

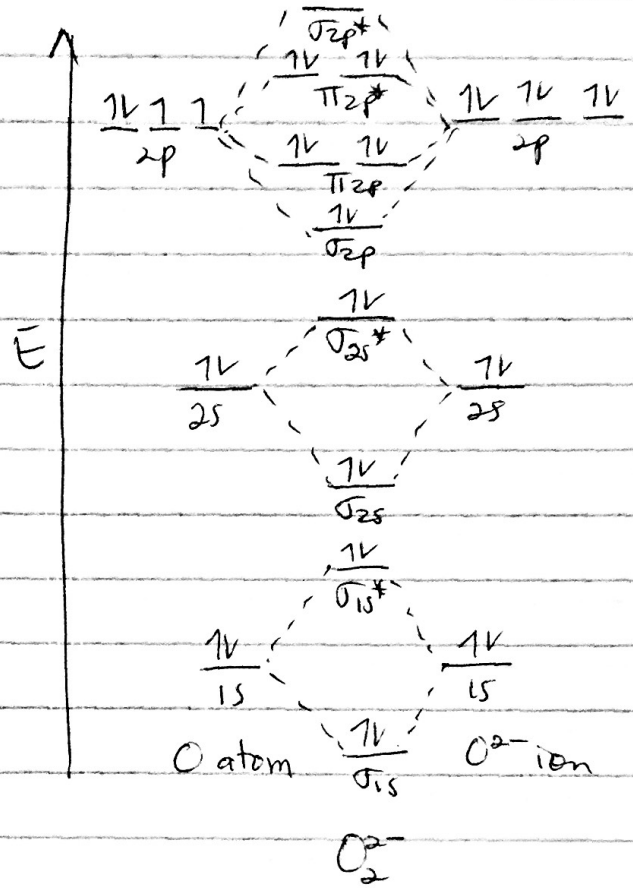


Paramagnetic
One unpaired e⁻



Paramagnetic
two unpaired e⁻





Paramagnetic
one unpaired e^-

③ $E = hc\tilde{\upsilon}$

$= (6.626 \times 10^{-34}\ J \cdot s)(3.00 \times 10^{10}\ cm/s)(1953\ cm^{-1}) = 3.88 \times 10^{-20}\ J$

↑ per photon

$\tilde{\upsilon} = \frac{1}{\lambda} \Rightarrow \lambda = \frac{1}{\tilde{\upsilon}} = \frac{1}{1953\ cm^{-1}} = 5.120 \times 10^{-4}\ cm$

$= 5120.\ nm$